

PATENT ABSTRACTS OF JAPAN

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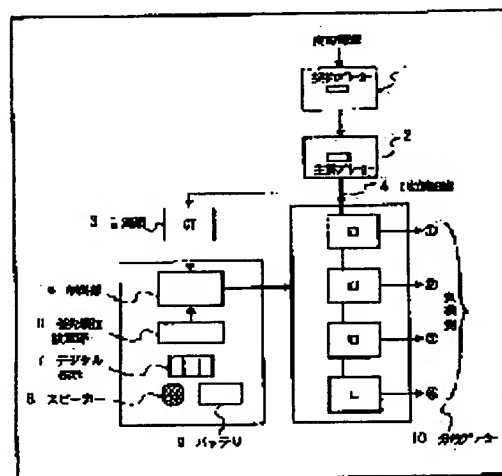
(54) CONTROL SWITCHBOARD

(57)Abstract:

PROBLEM TO BE SOLVED: To suppress the rush current which is generated when the power supply is restored or returns by issuing an alarm before the consumed exceeds a preset current value and controlling branch circuit breakers in the order of priority.

SOLUTION: The measurement of a consumed current is performed by using the current transformer of a measuring section 3 and branch circuit breakers 10 indicate their cutoff or thrown-in states by flickering a digital indicator 7 or changing the indicating color of the indicator 7.

When the power supply is interrupted, in addition, all of the breakers 10 (1)-(4) are cut-off. When the power supply is restored, the breakers 10 (1)-(4) are successively thrown in the order of, for example, priority by deciding their delay time. Consequently, a rush current suppressing function which can avoid the malfunction of a controlled switchboard by a peak current by inhibiting the rush current (a momentary large current) which is generated when the power supply is restored is obtained. When a power failure occurs, all of the branch circuit breakers are cut-off and, when the power supply is restored, the circuit breakers are successively thrown in accordance their prescribed delay time.



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CLAIMS

[Claim(s)]

[Claim 1] The control switchboard characterized by having an alarm means to generate an alarm before exceeding the current value which prepared the consumed-electric-current measurement section and said consumed electric current set up beforehand in the control switchboard containing a contract breaker, a chief editor breaker, and two or more branching breakers.

[Claim 2] The control switchboard according to claim 1 which prepares priority in said two or more branching breakers beforehand, and is characterized for said two or more branching breakers by cutoff/supplying according to priority according to the measurement value of said consumed-electric-current measurement section.

[Claim 3] The control switchboard according to claim 1 or 2 characterized by having the display which shows cutoff/injection condition of two or more of said branching breakers.

[Claim 4] The control switchboard according to claim 1, 2, or 3 characterized by intercepting said two or more branching breakers of all, throwing in said two or more branching breakers according to a predetermined time delay at the time of power return, and suppressing a rushes current when a power source fails for power.

[Claim 5] The control switchboard according to claim 1 to 4 characterized by building in the dc-battery which energizes the control section which controls cutoff/injection of said branching breaker.

[Claim 6] Said dc-battery is a control switchboard according to claim 5 characterized by being the rechargeable battery in which automatic battery charge is carried out by the power source.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the home peak shaving control switchboard which performs generating of the alarm of a control switchboard, especially the electrical and electric equipment depended for using too much, and cutoff and an injection of a branching breaker.

[0002]

[Description of the Prior Art] By the spread of home electronics, the electric dues in a home are way of an increment increasingly. If the amount of the electrical and electric equipment used in a home exceeds the level defined beforehand, the device of which it intercepts or warns automatically is used.

[0003] For example, the power control unit for household electric appliances which carries out a sequential halt of the supply of a home electrical machinery and apparatus according to priority at the time of an overcurrent is indicated by JP,3-285518,A.

[0004]

[Problem(s) to be Solved by the Invention] If it is in the conventional control distribution gear mentioned above, according to the cutoff ranking it was determined beforehand that exceeded contract current, an electrical machinery and apparatus is intercepted without a preliminary announcement one by one. Therefore, since a cutoff relay of each device is operated in order of a schedule and electric supply is stopped according to an individual, it is unknown in which device of operation operates or stops now.

[0005] Then, the purpose of this invention is to offer an effective control distribution gear at the home which can oppress power return or the rushes current (momentary high current) at the time of returning, after telling a resident about past [of the electrical and electric equipment / usage] with an alarm tone etc., urging cautions, performing cutoff/injection of a breaker according to priority and a power source's failing for power.

[0006]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the control switchboard by this invention is equipped with the following characteristic configurations.

[0007] (1) The control switchboard characterized by having an alarm means to generate an alarm before exceeding the current value which prepared the consumed-electric-current measurement section and said consumed electric current set up beforehand in the control switchboard containing a contract breaker, a chief editor breaker, and two or more branching breakers.

[0008] (2) The control switchboard of the above (1) which prepares priority in said two or more branching breakers beforehand, and does the cutoff/injection of said two or more branching breakers according to priority according to the measurement value of said consumed-electric-current measurement section.

[0009] (3) The above (1) which has the display which shows cutoff/injection condition of two or more of said branching breakers, or (2) control switchboards.

[0010] (4) The above (1) which intercepts said two or more branching breakers of all, throws in said two or more branching breakers according to a predetermined time delay at the time of power return, and suppresses a rushes current when a power source fails for power, (2), or (3) control switchboards.

[0011] (5) The above (1) which builds in the dc-battery which energizes the control section which controls cutoff/injection of said branching breaker thru/or one control switchboard of (4).

[0012] (6) Said dc-battery is the control switchboard of the above (5) which is the rechargeable battery in which automatic battery charge is carried out by the power source.

[0013]

[Embodiment of the Invention] Hereafter, the example of a suitable operation gestalt of the control switchboard of this invention is explained to a detail with reference to an attached drawing. Drawing 1 is the block diagram of the example of a suitable operation gestalt of the control switchboard of this invention. Drawing 2 is the flow chart for breaker cutoff actuation explanation of the control switchboard of drawing 1. Drawing 3 is the flow chart for breaker injection actuation explanation of the control switchboard of drawing 1.

[0014] First, the configuration of the control switchboard of this invention is explained with reference to drawing 1. This control switchboard is the contract breaker 1, the chief editor breaker 2, and the branching breaker 10 (it is the same as that of the home switchboard currently installed in the service entrance of the conventional ordinary homes in that it has ** thru/or **). However, although the control switchboard of this invention was mentioned above, it has added a control section 5, the priority setting section 6, digital display 7, a loudspeaker 8, a dc-battery 9, and the measurement section (CT) 3 outside.

[0015] Next, actuation of the control switchboard of this invention is explained with reference to drawing 2 and drawing 3. First, in initialization 21, the set point of the priority of the branching breaker 10, first stage processing, and second stage processing and the injection time delay of the branching breaker 10 of power return processing are set up in the priority setting section 6 after start 20.

[0016] It judges whether at consumed-electric-current monitor 1 step 22, the first stage processing value which set the consumed-electric-current value as the reading point by initialization 21 is exceeded. If the first stage processing value is exceeded, an alarm tone (buzzer) 23 will be generated with a loudspeaker 8. When a second stage processing value is exceeded, low branching breaker ** of the priority set up in the priority setting section 6 is intercepted (step 24).

[0017] A consumed-electric-current value is again read at step 25 of the consumed-electric-current monitor 2. It judges whether this read consumed electric current exceeds the second processing value. When the second processing value is exceeded, branching breaker ** of the following priority is intercepted (step 26). Hereafter, the consumed-electric-current monitor 3 (step 27) is repeated similarly, and branching breaker ** and ** are intercepted until it becomes a small value from the second processing value.

[0018] Next, when the consumed electric current decreases to a predetermined value by a certain cause, the sequential branching breaker 10 is thrown in according to the procedure (step 30 thru/or 37) shown in drawing 3. Since these steps 30 thru/or 37 are the same as that of step 20 of the breaker cutoff flow chart of drawing 2 thru/or 27 substantially, detail explanation is omitted. However, an injection of the branching breaker 10 carries out by the reverse order with the case of cutoff in order of high ** of priority thru/or **.

[0019] In addition, in these actuation, measurement of the consumed electric current is performed using the current transformer of the measurement section 3. Moreover, the branching breaker 10 can display the condition of having been intercepted or supplied, by flashing of digital display 7, or the change of a foreground color.

[0020] Moreover, when a power source fails for power, all of **s of the branching breaker 10 thru/or **s are intercepted. When power return is carried out, a time delay is defined, for example, the sequential injection of branching breaker ** thru/or the ** is carried out according to priority. Thereby, the rushes current at the time of power return is prevented, and the rushes current oppression function to avoid malfunction of the control switchboard by the peak current is obtained.

[0021] If it is in the control switchboard of this invention, as for cutoff/injection of a breaker 10, it is desirable to operate with the built-in dc-battery 9. Thereby, cutoff and an injection of a breaker 10 are certainly also at the time of interruption of service of a power source possible. Moreover, it can be enough coped with also at the time of interruption of service of long duration by making this dc-battery 9 into a charge type (secondary dc-battery), and charging always [of a power source / forward] automatically (when it not being interruption of service).

[0022] In the above, the configuration and actuation of the example of a suitable operation gestalt of the control switchboard of this invention were explained. However, that various deformation modification is possible can understand this invention easily to this contractor, without deviating from the summary. A branching breaker is not limited to four of ** thru/or **, but can be made with the number of arbitration if needed. Moreover, the priority of cutoff/injection of these branching breaker, the time delay of the breaker injection at the time of the power return after interruption of service, etc. can be freely selected with the manual operation button which is not illustrated.

[0023]

[Effect of the Invention] Since according to the control panel of this invention the alarm of this is carried out at a buzzer and sequential cutoff is carried out from the low branching breaker of priority as a second stage when priority is likely to be beforehand set up according to the significance of the electrical machinery and apparatus to be used and power consumption is likely to exceed a contract value so that I may be understood from above-mentioned explanation, it is possible to minimize the effect of a load depended for using too much. Moreover, cutoff/injection condition of a branching breaker can be displayed. Furthermore, it is possible by intercepting all branching breakers and throwing in a branching breaker according to a predetermined time delay at the time of power return at the time of interruption of service, to prevent a rushes cable run. Therefore, it is effective in a home switchboard etc.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the example of a suitable operation gestalt of the control switchboard of this invention.

[Drawing 2] It is a flow chart explaining cutoff actuation of the branching breaker of the control switchboard shown in drawing 1.

[Drawing 3] It is a flow chart explaining injection actuation of the branching breaker of the control switchboard shown in drawing 1.

[Description of Notations]

- 1 Contract Breaker
- 2 Chief Editor Breaker
- 3 Consumed-Electric-Current Measurement Section
- 5 Control Section
- 6 Priority Setting Section
- 7 Digital Display
- 8 Loudspeaker
- 9 Dc-battery
- 10 Branching Breaker

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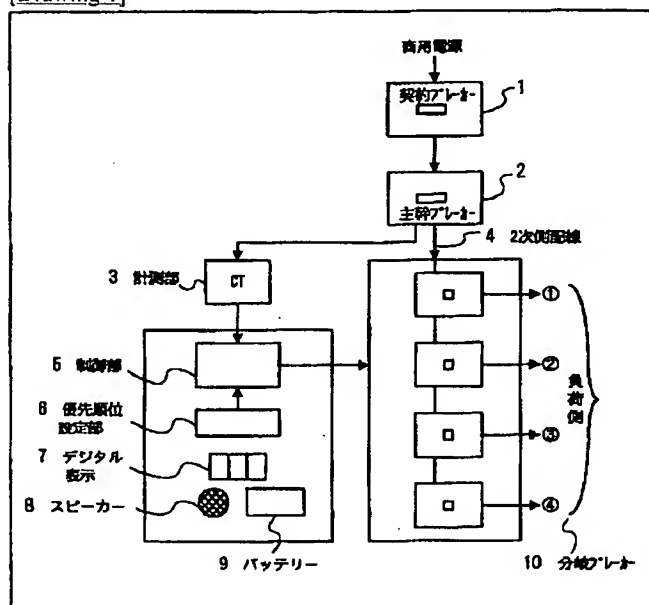
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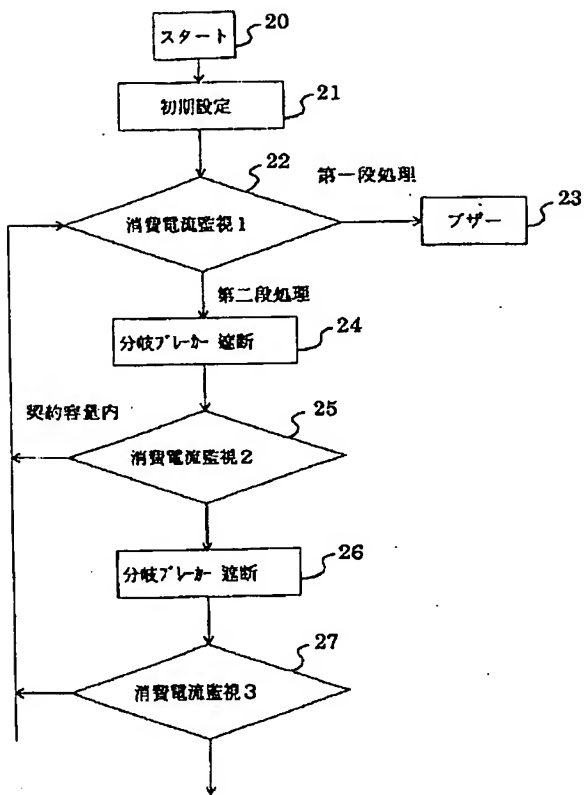
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DRAWINGS

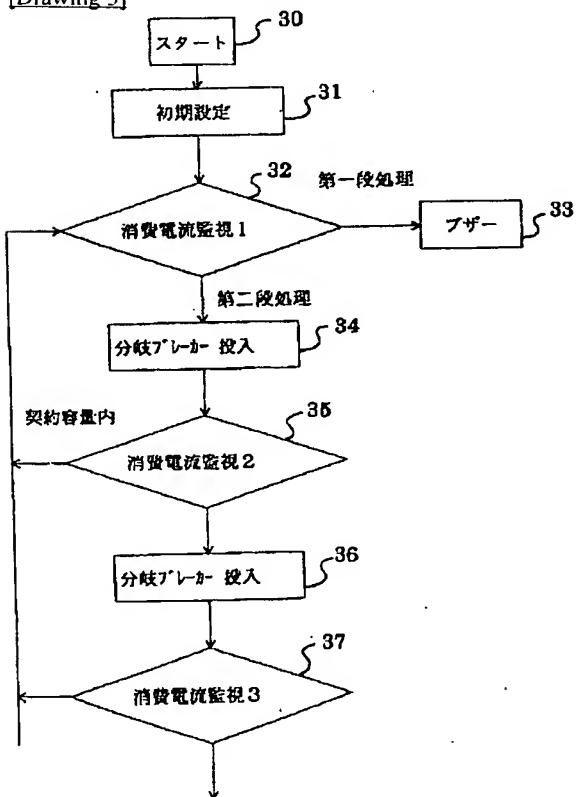
[Drawing 1]



[Drawing 2]



[Drawing 3]



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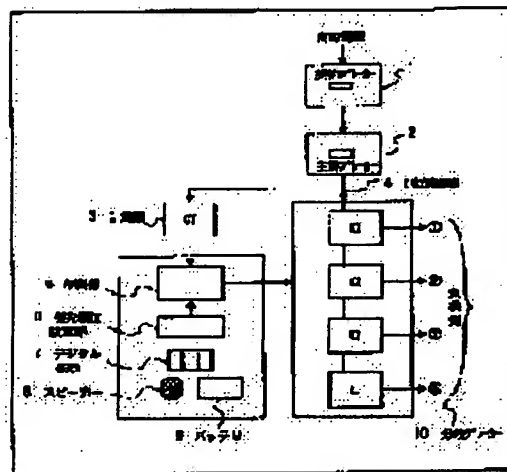
(72)Inventor : MORITA MITSUAKI

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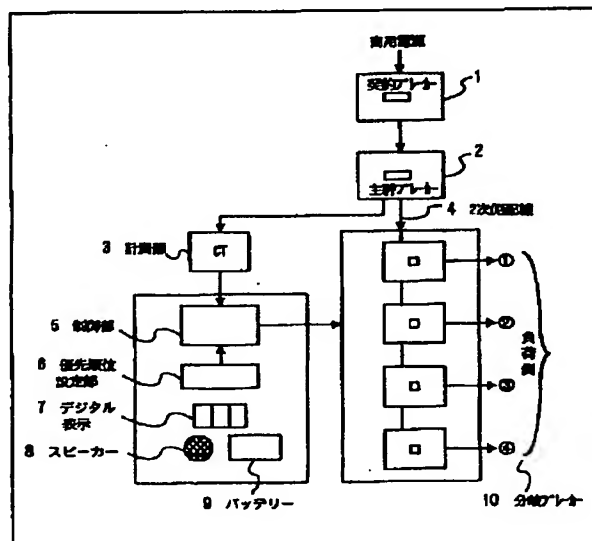
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(54)【発明の名称】 制御配電盤

(57)【要約】

【課題】 負荷が所定値に達しブレーカーを遮断する前に警報を発生すると共に分岐ブレーカーの遮断/投入状態が表示可能な制御配電盤を提供する。

【解決手段】 負荷(消費)電流を計測する計測部3を設け、複数の分岐ブレーカー10が遮断する前にスピーカ8にて警報を発生する。また、複数の分岐ブレーカー10は、優先順位に従って遮断/投入される。停電後の復電時にはラッシュ電流抑圧を行う。



【特許請求の範囲】

【請求項 1】 契約ブレーカー、主幹ブレーカー及び複数の分岐ブレーカーを含む制御配電盤において、消費電流計測部を設け、前記消費電流が予め設定した電流値を超過する前に警報を発生する警報手段を有することを特徴とする制御配電盤。

【請求項 2】 前記複数の分岐ブレーカーに予め優先順位を設け、前記消費電流計測部の計測値に応じて前記複数の分岐ブレーカーを優先順位に従って遮断／投入することを特徴とする請求項 1 に記載の制御配電盤。

【請求項 3】 前記複数の分岐ブレーカーの遮断／投入状態を示す表示部を有することを特徴とする請求項 1 又は 2 に記載の制御配電盤。

【請求項 4】 電源が停電した場合に、前記複数の分岐ブレーカーを全て遮断し、復電時には前記複数の分岐ブレーカーを所定遅延時間に従って投入してラッシュ電流を抑えることを特徴とする請求項 1、2 又は 3 に記載の制御配電盤。

【請求項 5】 前記分岐ブレーカーの遮断／投入を制御する制御部を付勢するバッテリーを内蔵することを特徴とする請求項 1 乃至 4 のいずれかに記載の制御配電盤。

【請求項 6】 前記バッテリーは電源により自動充電される充電式バッテリーであることを特徴とする請求項 5 に記載の制御配電盤。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、制御配電盤、特に電気の使い過ぎによる警報の発生、分岐ブレーカーの遮断・投入を行う家庭用ピークカット制御配電盤に関する。

【0002】

【従来の技術】 家電製品の普及により、家庭での電気使用料は益々増加の一途である。家庭での電気使用量が予め定めたレベルを超すと自動的に遮断又は警告する機器が使用されている。

【0003】 例えば、特開平 3-285518 号公報には過電流時に優先順位に従って家庭電気機器の供給を順次停止させる家電用電力制御装置が開示されている。

【0004】

【発明が解決しようとする課題】 上述した従来の制御配電装置にあっては、契約電流を超過すると予め定めた遮断順位に従って予告なしに順次電気機器を遮断する。従って、各機器の遮断リレーを予定順序で動作させ給電を個別に停止するので、現在どの機器が動作又は動作停止しているか不明である。

【0005】 そこで、本発明の目的は、電気の使い過ぎを警報音等で居住者に知らせて注意を促し、優先順位に従ってブレーカーの遮断／投入を行い、電源が停電した後に復電又は復帰した場合のラッシュ電流（瞬間的大電流）を抑圧することが可能な家庭で有効な制御配電装置

を提供することにある。

【0006】

【課題を解決するための手段】 前述の課題を解決するために、本発明による制御配電盤は、次のような特徴的な構成を備えている。

【0007】 (1) 契約ブレーカー、主幹ブレーカー及び複数の分岐ブレーカーを含む制御配電盤において、消費電流計測部を設け、前記消費電流が予め設定した電流値を超過する前に警報を発生する警報手段を有することを特徴とする制御配電盤。

【0008】 (2) 前記複数の分岐ブレーカーに予め優先順位を設け、前記消費電流計測部の計測値に応じて前記複数の分岐ブレーカーを優先順位に従って遮断／投入する上記 (1) の制御配電盤。

【0009】 (3) 前記複数の分岐ブレーカーの遮断／投入状態を示す表示部を有する上記 (1) 又は (2) の制御配電盤。

【0010】 (4) 電源が停電した場合に、前記複数の分岐ブレーカーを全て遮断し、復電時には前記複数の分岐ブレーカーを所定遅延時間に従って投入してラッシュ電流を抑える上記 (1)、(2) 又は (3) の制御配電盤。

【0011】 (5) 前記分岐ブレーカーの遮断／投入を制御する制御部を付勢するバッテリーを内蔵する上記 (1) 乃至 (4) のいずれかの制御配電盤。

【0012】 (6) 前記バッテリーは電源により自動充電される充電式バッテリーである上記 (5) の制御配電盤。

【0013】

【発明の実施の形態】 以下、本発明の制御配電盤の好適実施形態例を添付図を参照して詳細に説明する。図 1 は本発明の制御配電盤の好適実施形態例のブロック図である。図 2 は、図 1 の制御配電盤のブレーカー遮断動作説明用フローチャートである。図 3 は、図 1 の制御配電盤のブレーカー投入動作説明用フローチャートである。

【0014】 先ず、図 1 を参照して本発明の制御配電盤の構成を説明する。この制御配電盤は、契約ブレーカー 1、主幹ブレーカー 2 及び分岐ブレーカー 10 (①乃至 ④を有する点で、従来の一般家庭の引き込み口に設置されている家庭用配電盤と同様である。しかし、本発明の制御配電盤は、上述したものの外に、制御部 5、優先順位設定部 6、デジタル表示 7、スピーカー 8、バッテリー 9 及び計測部 (CT) 3 を追加している。

【0015】 次に、図 2 及び図 3 を参照して、本発明の制御配電盤の動作を説明する。先ず、スタート 20 の後、初期設定 21 において、優先順位設定部 6 で分岐ブレーカ 10 の優先順位、第一段処理及び第二段処理の設定値、復電処理の分岐ブレーカー 10 の投入遅延時間を設定する。

【0016】 消費電流監視 1 ステップ 22 で、消費電流

値を読み先に初期設定 21 で設定した第一段処理値をオーバーしているか否か判定する。もし第一段処理値をオーバーしていれば、スピーカー 8 により警報音（ブザー）23 を発生させる。第二段処理値をオーバーした場合には、優先順位設定部 6 で設定した優先順位の低い分岐ブレーカー ④ を遮断する（ステップ 24）。

【0017】消費電流監視 2 のステップ 25 で再び消費電流値を読む。この読み取られた消費電流が第二処理値をオーバーしているか否か判断する。第二処理値をオーバーしているときは、次の優先順位の分岐ブレーカー ③ を遮断する（ステップ 26）。以下、消費電流監視 3（ステップ 27）を同様に繰り返して、第二処理値より小さい値になるまで分岐ブレーカー ②、① を遮断する。

【0018】次に、何らかの原因で消費電流が所定値まで減少した場合には、図 3 に示す手順（ステップ 30 乃至 37）に従って順次分岐ブレーカー 10 を投入する。これらステップ 30 乃至 37 は、実質的に図 2 のブレーカー遮断フローチャートのステップ 20 乃至 27 と同様であるので詳細説明は省略する。但し、分岐ブレーカー 10 の投入は、優先順位の高い ① 乃至 ④ の順に、遮断の場合とは逆の順序で行う。

【0019】尚、これら動作において、消費電流の計測は、計測部 3 の変流器を使用して行う。また、分岐ブレーカー 10 は、遮断又は投入された状態をデジタル表示 7 の点滅又は表示色の切替えにより表示可能である。

【0020】また、電源が停電した場合には、分岐ブレーカー 10 の ① 乃至 ④ の全てを遮断する。復電した場合には、遅延時間を定めて、例えば優先順位に従って分岐ブレーカー ① 乃至 ④ を順次投入する。これにより、復電時のラッシュ電流を阻止し、ピーク電流による制御配電盤の誤動作を回避するラッシュ電流抑圧機能が得られる。

【0021】本発明の制御配電盤にあっては、ブレーカー 10 の遮断／投入は内蔵バッテリー 9 により作動するのが好ましい。これにより、電源の停電時にも確実にブレーカー 10 の遮断や投入が可能である。また、このバッテリー 9 は、充電式（二次バッテリー）とし、電源の正常時（停電でないとき）に自動的に充電することにより、十分長時間の停電時にも対処可能である。

【0022】以上、本発明の制御配電盤の好適実施形態例の構成及び動作を説明した。しかし、本発明は、その要旨を逸脱することなく種々の変形変更が可能であることが当業者には容易に理解できよう。分岐ブレーカーは ① 乃至 ④ の 4 個に限定されず、必要に応じて任意数となし得る。また、これら分岐ブレーカーの遮断／投入の優先順位や停電後の復電時のブレーカー投入の遅延時間等は図示しない操作ボタン等により自由に選定可能である。

10 【0023】

【発明の効果】上述の説明から理解される如く、本発明の制御盤によると、使用する電気機器の重要度に応じて予め優先順位を設定し、消費電力が契約値をオーバーしそうな場合には、これをブザーで警報し、第二段として優先順位の低い分岐ブレーカーから順次遮断するので、負荷の使い過ぎによる影響を最小限にとどめることが可能である。また、分岐ブレーカーの遮断／投入状態は表示することが可能である。更に、停電時には、分岐ブレーカーを全て遮断し、復電時には所定遅延時間に従って分岐ブレーカーを投入することによりラッシュ電流を阻止することが可能である。従って、家庭用配電盤等に有効である。

【図面の簡単な説明】

【図 1】本発明の制御配電盤の好適実施形態例のブロック図である。

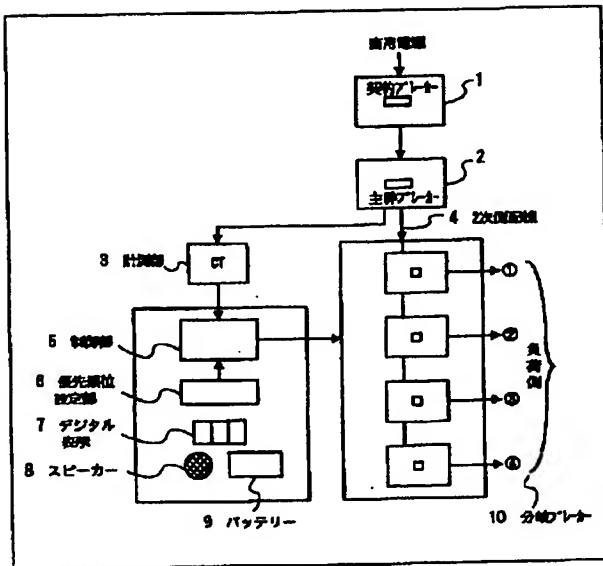
【図 2】図 1 に示す制御配電盤の分岐ブレーカーの遮断動作を説明するフローチャートである。

【図 3】図 1 に示す制御配電盤の分岐ブレーカーの投入動作を説明するフローチャートである。

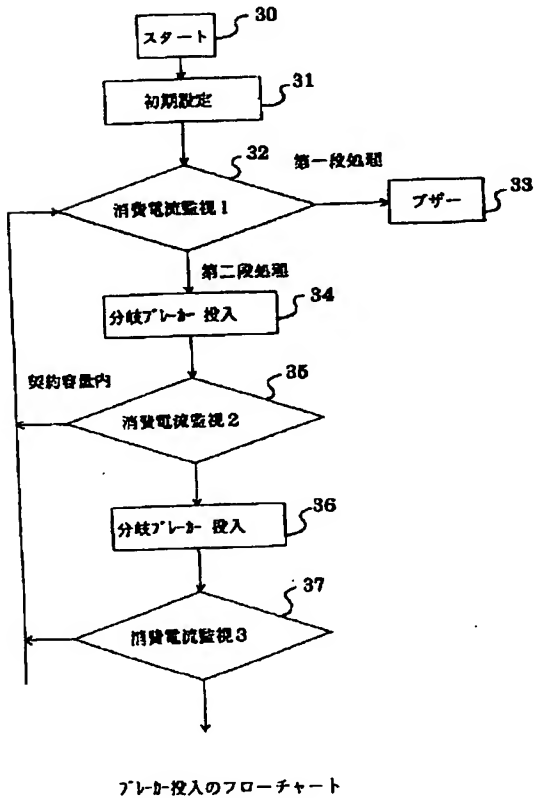
30 【符号の説明】

- 1 契約ブレーカー
- 2 主幹ブレーカー
- 3 消費電流計測部
- 5 制御部
- 6 優先順位設定部
- 7 デジタル表示
- 8 スピーカー
- 9 バッテリー
- 10 分岐ブレーカー

【図1】



【図3】



【図2】

